

REMARKS

The only issue outstanding in the Office Action mailed June 4, 2003, is the rejection under 35 U.S.C. §103. Reconsideration of this issue, in view of the following discussion, is respectfully requested.

Claims 1-2, 4-5 and 7-18 remain rejected under 35 U.S.C. §103 over Billion taken with Kydd, Walker and Cody. Reconsideration of this rejection is respectfully requested.

Billion discloses a process for the improved production of middle distillates with the production of high viscosity oils from heavy petroleum cuts. The steps involved in the process include a first step wherein a feedstock is contacted with an amorphous catalyst with a hydro-dehydrogenating function and a second step wherein the product of the first step is contacted with a second catalyst comprising a support, a Y zeolite, at least one group VIB element and at least one group VIII metal, in the presence of hydrogen. Billion further discloses that the product of the second step is fractionated to obtain a residue containing the oil and middle distillates and that a portion of the residue of the second step can be recycled and mixed back with the product of the first step, although the process is preferably carried out without recycling the residue to avoid polyaromatic compounds (col. 4, lines 8-12). Nowhere does Billion disclose or suggest that a fraction can be recycled back to a first catalytic hydrogenating step. Specifically, Billion discloses that an unspecified portion of the fractionated oil residue can be recycled not to the first step, wherein the cut is contacted with hydrogen and a catalyst containing an amorphous support, group VI and group VIII elements, but to the second step, wherein the product of this first step is contacted with a second, zeolite-based catalyst, see column 2, lines 49-55. Thus, the cited reference fails to disclose the presently claimed recycle step, in which a fraction of the oil residue having low viscosity, separated in step c), is recycled to the initial treatment of the feed with hydrogen and the non-zeolitic catalyst.

To remedy this deficiency, the Office Action cites Kydd arguing that Kydd teaches recycling a resid to hydrogenation step desirably increases the conversion. Applicants respectfully disagree with this analysis.

First, a careful analysis of the disclosure of Kydd reveals that it is *not* the resid fraction

which is recycled to the hydrogenation, but rather overhead supernatant from acid precipitation of the preasphaltenes in the resid. See, for example, col. 1, lines 66 to col. 2, line 2. See also, the figure, in which preasphaltenes are removed from vessel 46 after precipitation, through line 49, while overhead supernatant from the precipitation is recycled via line 48 to the reactor 20. The only other recycled stream shown in the patent is that of line 31, which recycles hydrogen from a separation of gas from light hydrocarbons. Thus, the underlying basis for the Office Action's combination of these references is in error. Moreover, it is submitted that Kydd is nonanalogous with Billion, since Billion desires to produce middle distillates, that is, materials of lower viscosity, and recycles the oil base residue, materials of higher viscosity, to the extent it even teaches recycling. It is not seen, as a result, that one of ordinary skill in the art would find the motivation to combine these references, at least since there is no supernatant overflow in Billion, in view of the divergent processes.

Moreover, even if one of ordinary skill in the art were to combine these processes, the result would not be that which is presently claimed, in which a fraction of lower viscosity is recycled to the initial catalytic step. In Cody, the only recycled stream, as noted above, is one of overhead supernatant from an acid precipitation of preasphaltenes. There is essentially no comparable step in Billion, and it can be seen that separator vessel 36 in Kydd produces a variety lighter streams (38, 39 and 40) and heavy materials are recovered - not recycled - from distillation in reactor 42, through line 43. Thus, it is submitted that, if one of ordinary skill in the art were to combine these references, one of ordinary skill in the art would not be taught to recycle any of the fractions resulting from separator 36 of Kydd, but instead is only taught, at best, to recycle the supernatant from a precipitation of the heaviest fractions. This would not result in the presently claimed process, in which a fraction of low viscosity index from thermal diffusion is recycled to the initial step.

In addition, the combination of references fails to suggest independent claim 18, which excludes a step such as step 2 of Billion employing a zeolite. This claim has been apparently overlooked in the current Office Action.

Finally, it is important to note that the objects of Billion, Walker and Kydd, at least, are to obtain materials having reduced pour point and lower viscosity. For example, while Billion

collects both middle distillates and a higher viscosity material, Walker collects a "heart cut" of an oil with a reduced pour point, see Table IB and col. 7, lines 39-42. Kydd also preferably collects the lower viscosity cuts, see lines 38, 39 and 40 of the figure, as well as col. 3, lines 5+. By contrast, the present process is directed to one in which the lower viscosity cuts are recycled, and the preferred product is a higher viscosity material. It is respectfully submitted that, in view of the preference in all of the references for the production of lower viscosity cuts, the combination of the references simply does not result in the present process. Moreover, to the extent that Billion in fact discloses desirability of a higher viscosity cut (which is not entirely clear from patentees disclosure) this would render the reference considerably non-analogous with the secondary references, as noted above.

Finally, it is maintained that the declaration under 37 C.F.R. §1.132, submitted with the prior response, clearly shows unexpected results due to the presently claimed recycling. As noted previously, the declaration demonstrates substantially improved viscosity index, where fractionation with recycle is performed and the non-recycled streams are blended with the fractions which are recycled. Table 6 of the declaration shows the results obtained where there is no recycling (nine fractions are produced, and blended to form streams I and II which correspond respectively to the blend of fractions 1 to 6 and 7 to 9). Stream I is obtained with a conversion of 66% and a viscosity index of 158. Stream II exhibits a conversion of 34% and a viscosity of 75. Stream II is low yield and off-spec, i.e., not sustainable for use by itself. Stream I has a higher viscosity, but is produced with a yield which is well below 100%. By contrast in Example 2, where recycling occurs, there is no production of off-spec final product (all such fractions are recycled), a high viscosity index oil is obtained, in a yield that is close to 100% by weight, and the amount of waste is minimized. One of ordinary skill in the art would simply not expect that fractionation when coupled with recycling would enable such an improvement in viscosity index. There is no recycle of stream II in the declaration, and the yields of Table VI thus correspond to a once through reaction (one pass). Thus, the concern expressed at page 9 of the final rejection (that it was unclear whether the recycled streams contents were included when the final product yields are calculated) is not an issue.

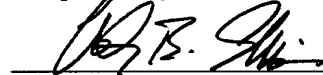
Accordingly, withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

Claims 6 and 19-20 have also been rejected under 35 U.S.C. §103 over Billion taken with Walker and Garwood et al. '177. Reconsideration of this rejection is respectfully requested.

Garwood is cited solely for its teachings of dewaxing. Garwood does not remedy these deficiencies of the above discussed references in that it also fails to suggest the particular recycle as claimed. The combination of Garwood with any of the above-cited reference fails to render obvious the instant claims. Thus, it is submitted that this rejection should also be withdrawn. The claims in the application are submitted to be in condition for allowance. However, should the examiner have any questions or comments, she is cordially invited to telephone the undersigned below.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



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